and rancid fats. Soaps, even when combined with antiseptic substances, possess little or no antiseptic power, even in more than the quantities in which they are ordinarily used. Dr. Addis has investigated the causation of hæmophilia, the "bleeding disease." He finds that the essential factor is a qualitative defect in the prothrombin, whereby blood coagulation in the hæmophilic individual is delayed; on the other hand, quantitatively all the elements necessary for blood-coagulation are present in the normal individual.

Distemper in dogs and other animals has been investigated by Dr. M'Gowan, who has regularly isolated in this condition a bacterium with distinct characters. Dr. John Fraser has investigated the prevalence of the human and bovine types of the tubercle bacillus in bone and joint tuberculosis occurring in children. He finds that the bovine type of bacillus is present in more than half the cases.

The Edinburgh College of Physicians is to be congratulated on the results of their liberal endowment of research; and in the preface due acknowledgment is made of additional financial assistance received from the Carnegie Trust. R. T. H.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Piltdown Skull and Brain Cast.

IN my previous letters (NATURE, October 2, p. 131, and October 30, p. 267) I refrained from entering into a detailed consideration of the reconstruction of the Piltdown skull, because I am preparing for presentation to one of the learned societies a full statement of all the facts and considerations bearing upon the points at issue. But I am glad to accede to Prof. Keith's invitation (NATURE, November 6, p. 292) to publish a drawing of the brain cast for comparison with his (NATURE, October 16, p. 198, Fig. 2).

It is a pleasure to express my hearty agreement with his appreciation of the excellence of Mr. Barlow's workmanship and of Dr. Smith Woodward's courtesy in permitting anatomists freely to handle and examine the precious fragments. Mr. Barlow's casts of the fossil bones are certainly the best examples of such modelling that I have ever seen; and I strongly resent the interpretation (*op. cit.*, p, 292) put upon my remarks in reference to them. But even such realistically perfect copies cannot display structural details such as the texture of bone, the precise location of certain faintly marked sutures, and the nature of sutural edges of the bones; and all of these points are of crucial importance in this discussion.

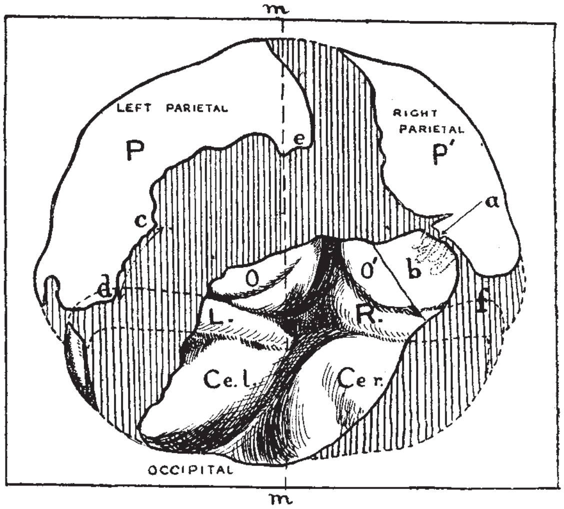
On the actual fragments, for example, one can see quite plainly a part of the *right* half of the coronal suture (not visible on the cast), meeting the more obvious left half at an angle which must, of course, be upon (or very close to) the median plane. Now this point lies upon the forward extension of the plane *mm* (see fig.), which was determined from other evidence (see NATURE, October 30, p. 267).

Then again the texture of the bone covering the area on the brain cast near the line *mm* just above the point *e* (see fig.) is characteristic of that which comes into contact with the median longitudinal sinus. This is further confirmation of the accuracy of the determination of the line *mm*. There are three other features of the bone in the neighbourhood of the line corresponding to *mm*, namely the supralambdoid flattening, the arrangements and medial relations of the meningeal grooves, and the median groove in the frontal region, which confirm this identification of the line *mm* as a close approximation to the real median plane.

On these grounds the orientation of the left parietal (P) to the median plane (*mm*) is settled; but we have still to determine its position in relation to the occipital upon that plane.

In spite of the extreme asymmetry of the posterior poles of the cerebral hemispheres (O and O^1), the two halves of the cerebellum (Ce.l. and Ce.r.) and the lateral sinuses (L. and R.), the orientation of the occipital fragment upon the median plane is fixed, as Prof. Keith has explained (NATURE, October 16, p. 198).

The broken piece (*b*) fits accurately upon the main fragment (O^1), and as it bears upon its external face and lateral edge traces of the right part of the lambdoid suture, it is important as giving some indication of the breadth of the occipital bone at this level. [To avoid the addition of another diagram, I have inserted alongside the letter *b* a stippled design to suggest, in a purely diagrammatic manner, the extent and complexity of a small fragment of the lambdoid suture preserved upon the external face of the bone that covered the area *b*.]



Now that the occipital and left parietal fragments have been orientated upon the line *mm*, the problem remains of determining their relative heights the one to the other upon that line.

The left lateral sinus left its imprint upon the occipital (L.) and also upon the lower corner of the left parietal (at *d*). Although the sinus is sometimes distinctly arched upward as it passes from the occipital to the parietal, the points *d* and the upper margin of L are as a rule on approximately the same horizontal plane, both in man and the anthropoid apes. Thus we cannot go far wrong if we bring the occipital and the left parietal into the positions shown in the diagram.

But Prof. Keith will object (NATURE, October 16,

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p. 198) that this will not bring the two halves of the lambdoid suture (*cd* and *ab*) into symmetrical positions. In answer to this criticism it may be said that the lambdoid suture in this restoration is as nearly symmetrical as it is in many ancient and modern skulls. Moreover, in the case under consideration there is the most positive evidence of a lack of complete symmetry. Not only is there the most striking asymmetry in the whole occipital area (compare O and O^1 and Ce.l. and Ce.r.), but the remains of the lambdoid suture itself present a marked contrast on the two sides, being quite simple on the left (*cd*), but complex and dentate on the right (*b*). To base any far-reaching conclusions upon the position and direction of an isolated centimetre (*b*) of the lambdoid suture (see NATURE, October 16, p 198) is simply courting disaster. For every anatomist knows that the lambdoid is the most variable and tortuous of all the cranial sutures.

Another indication of asymmetry of the lambdoid suture is the direction of the fragment marked *e*. My critics may say that as it points towards the piece *cd* and not towards *b* and *f*, it clearly belongs to the left and not to the right half of the suture, and that it would fall into its proper position if the left parietal were moved wholly to the left side of the line *mm*. But such a deviation as *e* is quite common. A precisely similar thing occurs in the Gibraltar skull, and in the La Quina skull there is a Wormian bone near the corresponding spot on the right side.

So far I have said nothing of the right parietal fragment (P^1). It bears only a very small fragment (*a*) of the lambdoid suture, which, of course, must lie somewhere near the line joining *e* and *f*. Its lower margin does not quite reach the lateral sinus at *f*. With these and other guides (supplied by the impressions of the brain and meningeal vessels) this fragment may be orientated in a position approximately symmetrical to the left side. Incidentally, as the point *a* must be in the neighbourhood of the sutural line on *b*, the position of the right parietal fragment (P^1) so determined checks the accuracy of the position of the left parietal (P).

No exact symmetry between P and P^1 is attainable because the brain itself is not symmetrical. In the human brain the type of occipital asymmetry seen in this case (O and O^1) is usually associated with a greater prominence of the right parietal eminence (P^1). This was the case in the Piltdown brain. In further confirmation of the reality of this it is found that the right parietal bone is very much thinner than the left, so that, as in the occipital region, the full extent of the cerebral lack of symmetry is not displayed in the outline of the skull.

In making the drawing illustrating this letter I have used a cranial cast which Dr. Smith Woodward kindly sent me a few weeks ago, but have made some slight alterations in the positions of the two parietal fragments.

In conclusion I should like to say how much I am indebted to Prof. Keith for all the help he has given me in my investigations, not only by allowing me to make use of all the valuable material in the museum of the Royal College of Surgeons, but also by discussing with me frankly and openly all the points in dispute concerning the Piltdown skull itself. In the earlier part of July, working with the cranial casts, he seemed to me to have established a good case for his mode of reconstruction; but from the moment I began to examine the actual fragments (August 13, 1913, the day after the discussion of the matter at the International Medical Congress) I became convinced that his solution of the problem was an impossible one. It was this personal experience of the importance of working with the real things that I had in mind when I was writing my last letter (NATURE, October 30, p. 267).

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The Piltdown Mandible.

IN *The British Journal of Dental Science* of October 1, there are published some excellent radiograms of the Piltdown mandible and of a chimpanzee's, the views having been taken from the side and from above.

In order to compare the outlines of the two specimens, I have superimposed tracings taken from each (Figs. 1 and 2).

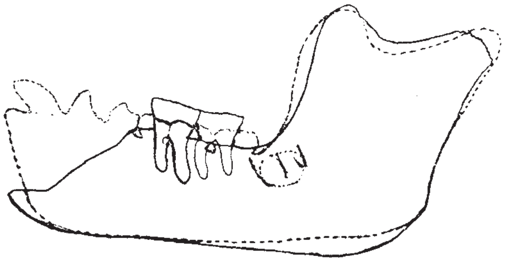

FIG. 1.—Outline tracing from radiograms of the Piltdown mandible (continuous line) and of the mandible of chimpanzee (broken line).

The similarity of the specimens brought out in this way is very striking, for the outlines are practically identical. I have also superimposed tracings of the last reconstruction of the Piltdown mandible and of the jaw of a young chimpanzee (Fig. 3), and again the similarity of the outline is very remarkable. No human mandible is known which shows anything like the same resemblance to the chimpanzee jaw in outline and in all its details.

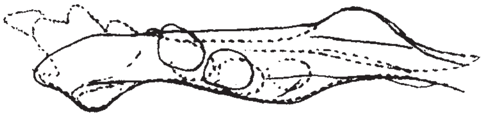

FIG. 2.—Outline tracing from radiograms of the Piltdown mandible (continuous line) and of a chimpanzee (broken line as viewed from above.

Of the molar teeth, I need only say here that not only do they approach the ape form, but in several respects are identical with them.

The cranial fragments of the Piltdown skull, on the other hand, are in practically all their details essentially human. If that be so it seems to me to be as inconsequent to refer the mandible and the cranium to the same individual as it would be to articulate a chimpanzee foot with the bones of an essentially human thigh and leg.

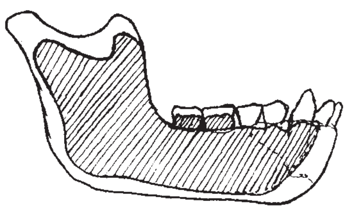

FIG. 3.—Outline tracing of the last reconstruction of the Piltdown mandible, and of the mandible of a young chimpanzee (shaded

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